

ABSTRACT

5 An improved semiconductor wafer processing apparatus 10 includes a series of processing stations combined in one form, coupled together by computer-controlled cluster tooling. Wafers are supplied in a pod to an input station 28 which initiates a data record for recording processing results at each station. A sacrificial film 140 is applied to the surface 135 of each wafer. Individual wafers are transferred to a computer-controlled defect-mapping station 14 where particulate defects 130 are identified and their position coordinates recorded. Defect-mapped wafers are transferred to a computer-controlled laser area cleaning station 11 which lifts the defects and sweeps the wafer surface clean, except for stubborn defects. Clean wafers are transferred to a final mapping station 20 or 22, followed by transfer of the wafers to an output station 30. Wafers having remaining stubborn defects are transferred to a second defect-mapping station 16 where stubborn defects are located by coordinates, after which the wafers are transferred to a defect review tool incorporating a scanning electron microscope (SEM-DRT) 24. A SEM image review of stubborn defects includes chemical analysis of the stubborn defects. A laser point-cleaning station 13 lifts and sweeps each stubborn defect individually from the wafer surface. Cleaned wafers are transferred to a third defect-mapping station 18 for recording any stubborn defects remaining, then to a second laser area cleaning station 12 for a final cleaning, followed by transfer of the wafers to a final mapping station 20 or 22 for mapping of any remaining stubborn defects. The accompanying data records are updated followed by transfer of the wafers to an output station 30.